Safety and Efficacy of Percutaneous Trigger Finger Release

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Twenty-five A1 pulleys in 5 fresh cadaveric hands and 13 trigger fingers in 11 patients were released percutaneously with a 19 gauge needle, as described by Eastwood et al., to determine the efficacy and safety of the technique. Over 90% of the length of each individual finger and thumb A1 pulley were successfully released in the cadaveric digits with no injuries to the A2 pulley, nerves, or vessels. Superficial abrasions were noted in four superficialis tendons. In our surgical series, complete clinical release (eradication of triggering) was achieved in each digit. In 8 of 13 digits, the A1 pulley was found to be completely divided on open exploration. In five digits, while triggering was eliminated, some of the A1 pulley remained intact. There were no complications. Because of the proximity of digital nerves, we do not perform percutaneous release in the index finger or thumb. (J Hand Surg 1995;20A:280–283.)

Surgical release of the A1 pulley is recommended when conservative treatment or steroid injection fails to relieve painful triggering of the flexor tendons. Open trigger finger release is generally considered a simple and reliable procedure, although two small series report a significant incidence of complications and patient dissatisfaction.[1,2] If equally effective, a percutaneous release would avoid the time and expense of an outpatient surgical procedure. In addition, one would expect a reduction in the incidence of scar tenderness and possibly infection, which are reported complications of the open technique. Several techniques for closed or percutaneous release of the A1 pulley have been described with reported satisfactory clinical results and few complications.[3–6] The technique of Eastwood et al. uses a 19 gauge needle to percutaneously section the A1 pulley.[3] In this study we investigated the safety and efficacy of this technique in cadavera and performed open inspection of the first annular pulley after percutaneous release in a small series of patients.

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Materials and Methods

We released 25 digital pulleys in 5 fresh frozen cadaveric hands using the method of Eastwood et al.[3] The flexor tendons were isolated at the wrist, enabling active flexion of each digit. The digit to be released was held firmly with the metacarpophalangeal (MP) joint hyperextended throughout the procedure. A 19 gauge needle was introduced perpendicularly through the A1 pulley into the flexor tendon. The needle was inserted through the skin several millimeters distal to the distal palmar crease for the long, ring, and small fingers and the proximal palmar crease for the index finger. The thumb A1 pulley was released through the MP crease. The position of the needle in the tendon was confirmed by actively flexing the digit and observing the motion of the needle. The needle was then withdrawn from the tendon and the bevel of the needle oriented longitudinally with the tendon. The length of the A1 pulley was incised from proximal to distal using the bevel of the needle. Although no special technique was used, an effort was made to maintain the needle at a constant depth in the tissues during the release to avoid damage to the flexor tendon. The loss of a grating sensation as the pulley was cut indicated completion of the release. Each release was ex-

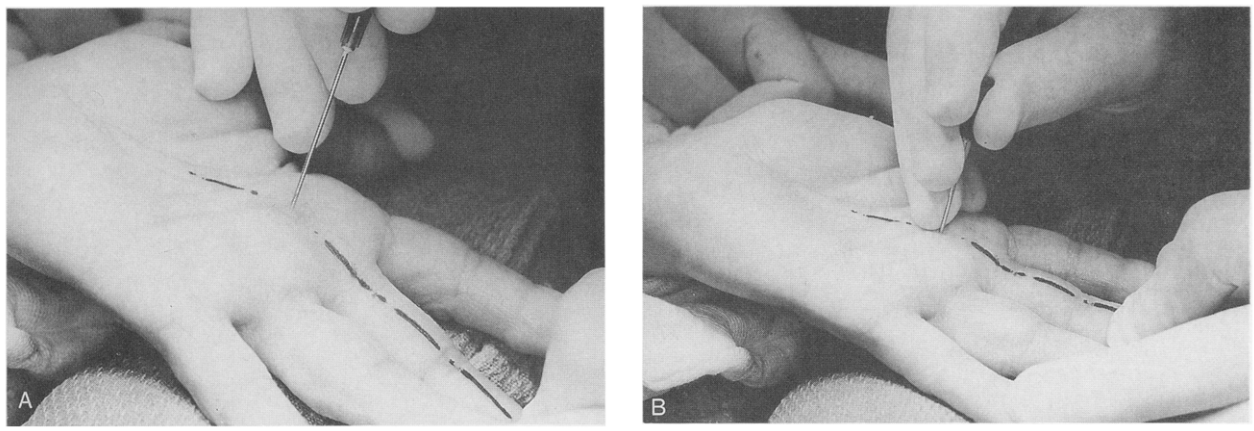

Figure 1. (A) Percutaneous release of a long finger A1 pulley. The MP joint is hyperextended and a 19 gauge needle inserted just distal to the flexor crease. The bevel of the needle is oriented longitudinally with the tendon. The skin markings indicate the path of the flexor tendons. (B) The needle is stabilized and the pulley is released from proximal to distal. Loss of a grating sensation as the pulley is cut indicates completion of the release.

plored through a transverse palmar incision to inspect the released pulley, flexor tendon, and relationship of the neurovascular bundles to the surgical site.

To determine the efficacy of this technique in a clinical setting, we percutaneously released 13 trigger fingers (6 long, 6 ring, 1 little) in 11 patients before an open surgical procedure. There were 8 males and 3 females with an average age of 62 years (22–77 years). The duration of symptoms at initial presentation ranged from 1 to 6 months (average, 3.5 months). There were no diabetics. One patient had advanced osteoarthritis and one patient had undergone a previous carpal tunnel release in the same hand. Each patient had failed a trial of conservative treatment, including at least a single steroid injection, and had consented to the percutaneous and open trigger release. Each patient was actively triggering at the time of surgery.

The procedure was performed under local anesthesia using the described technique (Fig. 1). After percutaneous release, the patient was asked to flex the finger to confirm relief of the triggering. If a patient demonstrated continued triggering, the needle was reinserted more distally and additional release performed. Clinical release was defined as the relief of active triggering immediately after percutaneous release. The extent of actual release of the A1 pulley was documented by a limited exploration through a 1 cm longitudinal incision. Any remaining fibers of the A1 pulley were divided if necessary.

In addition, the A1 pulley was percutaneously released in two fingers of patients undergoing excision of retinacular cysts, and in two fingers of patients who had painful nodules and intermittent triggering but were not actively triggering on the day of surgery.

Results

Over 90% of the length of each individual finger and thumb A1 pulley in the cadaveric hands was successfully released using the percutaneous technique. Any remaining fibers left unreleased were always at the distal aspect of the pulley. There were no A2 pulley injuries in any of the digits. Early in the series, we noted superficial longitudinal abrasions in the superficialis tendons but no tendon lacerations. No nerves or vessels were injured using this technique. In three thumbs, the radial digital nerve was within 2 mm of the needle site and in the remaining two thumbs the digital nerves were well clear of the pulley release. In each hand, the index radial nerve was tented over the MP joint as it was hyperextended and was within 2–3 mm of the needle site. Digital nerves and vessels to the remaining digits were well clear of the operative site.

In the surgical series, complete clinical release was achieved in all digits using the percutaneous technique before open exploration. Eight of the 13 digits had 100% release of the A1 pulley confirmed on open exploration. In the remaining five digits, 10–15% of the distal pulley fibers remained intact. There were no complications although we did note superficial scoring of the superficialis tendons in most of the surgical patients.

In the four patients who underwent percutaneous release of the A1 pulley before exploration for cysts or who were not actively triggering at the time of surgery, only two of the four digits had complete anatomic release. Twenty to fifty percent of the dis-

tal pulley was left unreleased in the remaining two digits. There were no complications in these patients.

Discussion

Stenosing tenosynovitis of the digital flexors, or trigger finger, is a common cause of pain and disability in the hand. Conservative treatment, including splinting and steroid injection, often succeeds in relieving painful triggering.[7–14] When an adequate trial of conservative treatment fails to relieve the patient's symptoms, then release of the A1 pulley is indicated. Percutaneous release of the A1 pulley avoids a potentially painful palmar incision and can be performed in the office.

Lorthioir[5] was the first describe a technique of subcutaneous release of the A1 pulley using a fine tenotome passed through the skin. He reported good results in 52 digits with only a few patients complaining of several days of discomfort after the procedure. Lyu performed a closed tenotomy of the A1 pulley on 47 trigger fingers and 16 trigger thumbs using a custom made pulley hook and curved blade. The release, performed through a 2–3 mm palmar stab wound proximal to the A1 pulley, was successful in 56 digits; 7 digits required extension of the incision and open tenotomy to complete the release. No complications were reported.[4] Tanaka et al.[6] performed a subcutaneous release of 116 trigger thumbs and 94 trigger fingers using a fine scalpel blade. On the basis of their point system, they reported an overall 64% excellent and 10% good outcome after an average of 24 months. The thumbs reportedly did better, with 80% excellent and 11% good results. No complications or nerve injuries were reported.[6] Eastwood et al.[3] recently described a percutaneous technique for the release of the A1 pulley using a 19 or 21 gauge needle. Thirty two of 35 releases had complete relief of symptoms at the 6-week followup examination. The remaining three fingers had residual grade 1 triggering,[12] one of which had a repeat procedure with relief of triggering. No significant complications or recurrences were reported with a mean follow-up period of 13 months.[3]

The percutaneous release described by Eastwood et al.[3] is simple and avoids the need for a palmar incision, but the release is blind with obvious potential complications. We were hesitant to attempt this release clinically without first evaluating its safety in a cadaveric study. Once we were comfortable with the technique and had established guidelines for its use, we began a clinical series.

The release was technically easier with the patients' pathologic pulleys compared with the cadaveric specimens. The thickened pulley was easier to identify and section and had a more pronounced grating sensation when cut. A more complete anatomic release was also obtained in digits that were actively triggering at the time of surgery. The A1 pulley was sectioned from proximal to distal until all clinical triggering was relieved. Eradication of triggering was achieved in all patients despite 10–15% residual unreleased distal pulley in five. Because all releases were completed openly following the percutaneous procedure, we do not know whether the remaining intact pulley in these five patients would have caused future dysfunction.

Early in the cadaveric study we recognized the importance of maintaining the needle at a constant level in the soft tissue to minimize tendon injury. The overlying palmar skin was almost always mobile enough to allow for release of the pulley through a single needle stick, although there was never any hesitation in making a second puncture wound more distally to safely complete the release. Despite this effort, some degree of superficial scoring was noted in almost all of the surgical releases. We believe this mild degree of injury, which seems unavoidable with this technique, should not affect the results of the release.

We believe percutaneous release of trigger fingers with a 19 gauge needle is both a safe and effective means of sectioning the A1 pulley in patients with active triggering who have failed conservative treatment including steroid injection. Despite the reported success of percutaneous release of the index finger and thumb in a number of published series, we believe the proximity of the nerves in these digits poses a significant potential risk of injury using the technique of Eastwood et al.[3] Therefore, we do not perform percutaneous release in the index finger or thumb.

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